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PEANUTS.

BY

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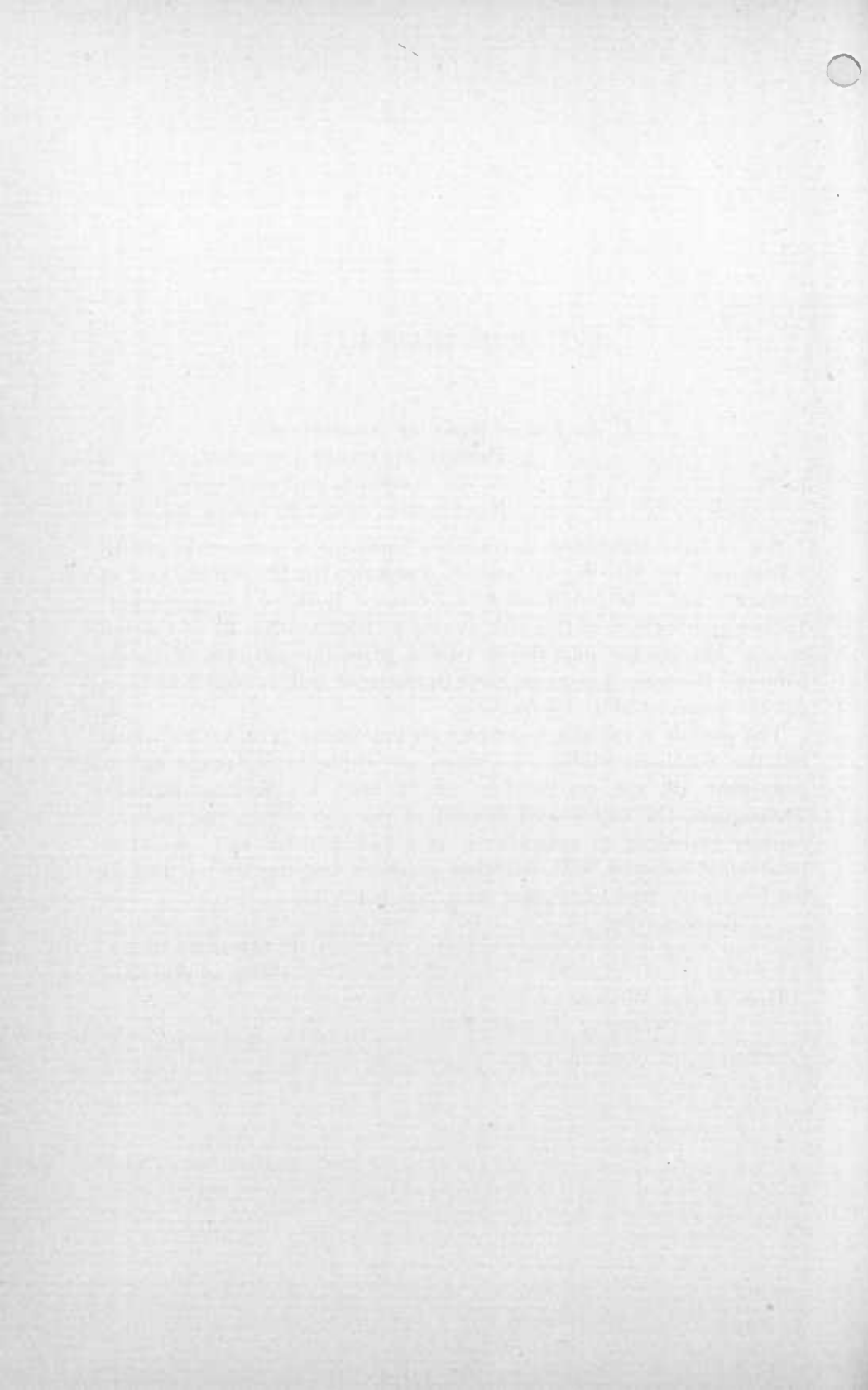
SIR: I have the honor to transmit herewith a manuscript entitled "Peanuts," by Mr. W. R. Beattie, Assistant Horticulturist, and recommend that it be published as a Farmers' Bulletin to supersede the former publication of this title issued as Bulletin No. 25 of the same series. During the past ten or twelve years the methods of production and the uses of peanuts have so changed and increased as to call for the issuance of a new bulletin.

The peanut is rapidly becoming an important farm crop throughout the Southern States. Its vines are valuable as forage and the peas that are not marketable can be used for feeding purposes. Throughout the boll-weevil district of the cotton belt the peanut is rapidly becoming of importance as a money crop, and special oil-producing varieties will doubtless assist in keeping the oil mills of the Southern States supplied with raw materials.

Respectfully,

B. T. GALLOWAY,
Chief of Bureau.

HON. JAMES WILSON,
Secretary of Agriculture.



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PEANUTS.

INTRODUCTION.

It is not definitely known when and where the peanut was first cultivated. Several allied species of plants are natives of Brazil, and there is every indication that the common peanut originally came from tropical America. Peanuts were introduced into the United States during the earlier days of colonization, but did not become of commercial importance until about 1870. From that time until 1897 the growth of the peanut industry was gradual, but a great increase in the production and use of peanuts has taken place during the last eight or ten years.

Botanically the peanut belongs to the same group of plants as do the beans and peas, but it possesses the character of maturing its fruit or nut beneath the surface of the soil rather than above ground, as do most other leguminous plants. The technical name of the peanut is *Arachis hypogea*, the name indicating the characteristic habit of the plant to mature its fruits underground. The peanut is known under the local names of "goober," "goober pea," "pindar," "ground pea," and "groundnut." The names "goober" and "goober pea" are more properly applied to an allied species having no true stem and only one pea in each pod which has been introduced and is frequently found growing wild in the Gulf Coast States. Properly speaking, the peanut is a pea rather than a nut, the term "nut" having been added on account of its flavor, which is similar to that of many of the true nuts.

The small yellow flowers of the peanut are borne in the little pocket where the leaves are attached to the stems, and as soon as pollination has taken place the visible portion of the flower fades and falls, after which the short, thick stem that supports the lower portion of the flower elongates and the sharp-pointed ovary is thrust downward into the soil, where the pod develops. Should the ovary fail to reach or penetrate the soil no pod will be formed.

The value of the commercial peanut crop of the United States for the year 1908 was estimated at \$12,000,000. During recent years

the area of production of peanuts has greatly increased, especially throughout the warmer parts of the country. The value of the peanut, both as a money crop and for feeding on the farm, renders it especially desirable as a part of the rotation wherever conditions suitable to its development exist.

Most persons think of the peanut as it appears for sale at the news and fruit stands, but during recent years many new lines of consumption have been found. In addition to the great quantity of peanuts sold in the shell each year, thousands of bushels are shelled for use in the manufacture of confections and food products.

It is the purpose of this bulletin to give full cultural directions for growing this crop, together with some of the uses of the peanut. The peanut is well adapted for use as a part of the cropping system in the Southern States, especially on the cotton and tobacco lands. Soils that will not produce more than one-fourth of a bale of cotton to the acre can be made to yield a fair crop of peanuts at a very low cost for growing. Comparatively few persons realize the value of peanuts when used as a farm crop, especially when the product is fed to live stock on the farm and eventually returned to the soil in the form of manure.

SOIL AND CLIMATIC REQUIREMENTS OF THE PEANUT.

The soil best suited to the peanut is one of a sandy, loamy nature, preferably light or grayish in color rather than dark. Soils that are dark and those carrying a considerable percentage of iron or other mineral are likely to stain the shells of the peanuts, thus rendering them less desirable for the trade. For agricultural purposes, however, the staining of the shells is of little consequence, as it does not materially injure them for stock feeding. In fact, soils that contain considerable clay and lime or are loamy in character produce heavier nuts and sometimes greater yields than do lighter soils. As a rule the peanut does best on a sandy loam with a well-drained clay subsoil, but the crop may be grown under a wide range of soil conditions. Soils that become hard or compact are not adapted to peanut growing, owing to the inability of the pod stems or "pegs" to penetrate the surface.

Soils that are poorly drained or sour are not suited to the peanut. The ideal soil consists of a sandy loam containing a reasonable amount of humus, or vegetable matter, together with an abundance of lime. A soil having a suitable mechanical consistency is the first essential. Soils lacking in fertility can be improved by a proper cropping system or by the judicious use of manures.

The cultivation of the peanut for commercial purposes has until recently been confined chiefly to areas in Virginia, Tennessee, the

Carolinas, and Georgia. During recent years the industry has become established throughout the South Atlantic States and westward to and including California. The territory indicated by the dark portion of the map shown as figure 1 is for the most part adapted to the production of peanuts for agricultural purposes; over a large part of this section a good grade of marketable nuts can be grown. This area, it will be observed, is one within which the frost-free season is comparatively long, and much of the territory has a soil containing a large percentage of sand or alluvial matter, making it easily cultivated and well adapted to the peculiar habits of the peanut plant. There are undoubtedly many sections outside of the area indicated by the map (fig. 1) that can be profitably devoted to

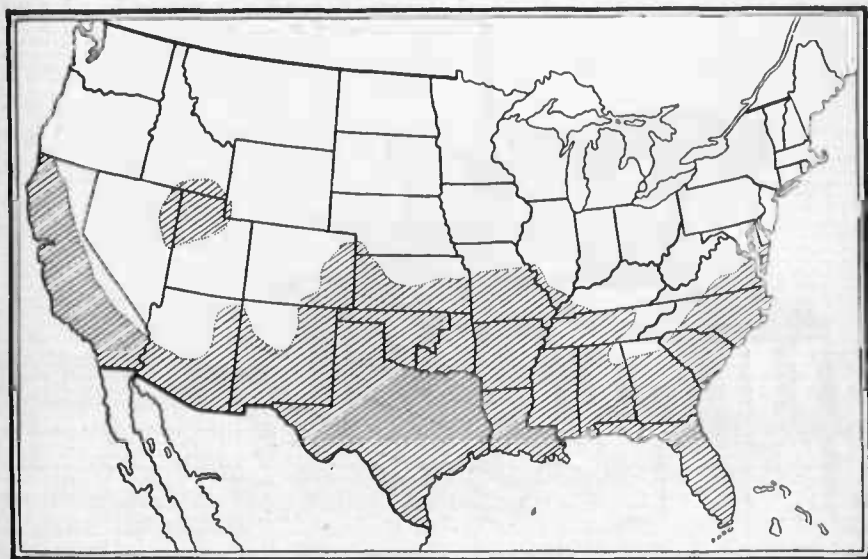


FIG. 1.—Map of the United States, showing the area adapted to the production of peanuts.

the production of peanuts for stock food, and a few regions where they can be grown commercially.

The climatic requirements of the peanut are a long season without frost, a comparatively light rainfall during the growing period, abundant sunshine, and a high temperature. The peanut is slightly more susceptible to injury from frost than the common bunch bean and requires a somewhat longer season for its development. The Spanish peanut will mature in ninety days under the most favorable conditions, but one hundred and ten to one hundred and twenty days should be allowed. The large-podded varieties require a longer period for best results.

PREPARATION OF THE SOIL.

Time for plowing.—The time for plowing the land to be planted to peanuts will depend somewhat upon its previous treatment. If the land has been in corn the season before and a crop of crimson clover was sown at the time the corn was laid by, it will be desirable to plow the land just before the clover blooms in order to get the greatest benefit from it as a green manure. If the land is in sod it will be desirable to break it during autumn or winter. If there is no crop on the land the plowing need only be done in time for planting, or rather but a short time before planting, in order to allow the soil to settle. Where a crop of crimson clover is turned under,

the soil should be thoroughly harrowed and rolled in order to obtain a compact seed bed and to retain moisture.

Depth of plowing.—The depth of plowing will depend somewhat upon the character and depth of the surface soil. On sandy soils that are underlaid by a clay subsoil it would be unwise to bring a very great quantity of the subsoil

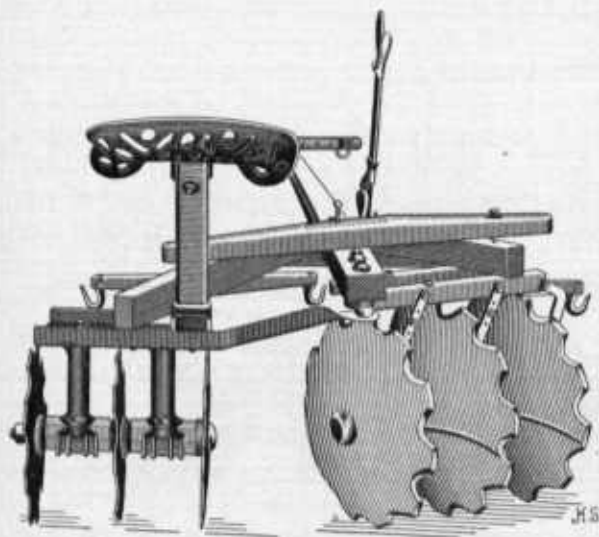


FIG. 2.—Disk plow adapted for fitting land.

to the surface. If the surface soil is not of sufficient depth, it should be increased by plowing a very little deeper each year until a sufficient depth is reached. As a general rule the depth of plowing for peanuts should not be quite so great as that for corn in the same locality. From 5 to 7 inches of loose soil will be sufficient for the growing of all varieties of peanuts. Subsoiling may prove beneficial on soils having insufficient drainage.

Preparation for planting.—When the land is plowed but a short time before planting it should be harrowed within a few hours after plowing, in order to prevent loss of moisture. On loose, sandy soils that are reasonably free from weeds or grass it is often possible to dispense with the regular plowing and cut the land with a disk

harrow or disk plow. A tool that is especially adapted for this purpose is shown in figure 2. This implement both cuts and turns the soil, leaving it in fine condition, so that it is readily prepared for planting.

Where plowing is necessary in order to turn under sod, clover, or weeds a tool of the type shown in figure 3 is desirable for smoothing and pulverizing the soil afterwards. This harrow is superior to the ordinary smoothing harrow in that it turns, crushes, and levels the soil in one operation. By means of a lever the cutting blades can be set to any depth, and the weight of a boy or light man upon the seat is sufficient to secure good work. If the soil is very loose it may be necessary to roll or drag thoroughly before planting.

Under ordinary circumstances level culture should be practiced, but where the drainage is poor it may be advisable to throw up slight ridges upon which to plant peanuts; this is especially desirable dur-

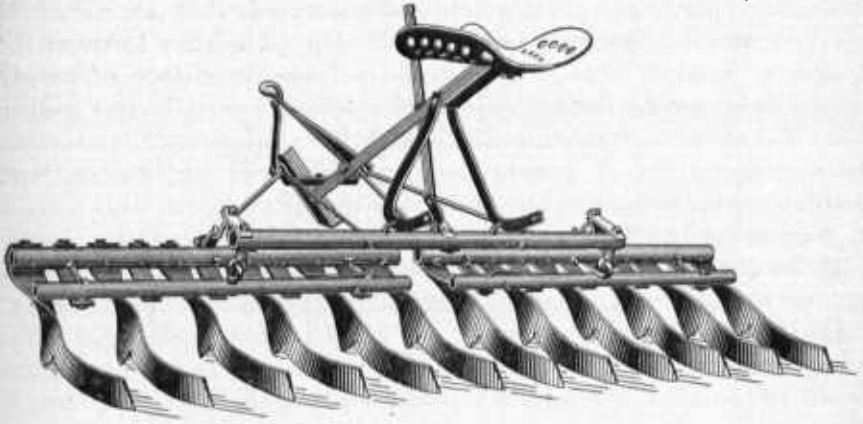


FIG. 3.—Harrow adapted for smoothing and pulverizing land.

ing a season of excessive rainfall. When ready for planting, the soil should be in the same general condition as that prepared for a crop of snap or bunch beans. Thorough preparation of the soil is profitable for all crops, and especially for peanuts. If the soil can be harrowed once a week for three or four weeks before planting, most of the weeds that would otherwise injure the crop will be destroyed.

FERTILIZERS AND PREPARATORY CROPS.

Cropping system and green manures.—Peanuts should be grown in rotation with other crops rather than as a specialty. The cropping system will depend somewhat upon the area of other crops grown, but the arrangement should be such that the land will be planted to peanuts one year in each three or four. A good rotation is corn

or cotton the first year with cowpeas planted between the rows at the time of the last cultivation; the next season plow under the remains of the cowpeas and plant the land to peanuts; as soon as the peanuts are harvested sow the land with rye and use as a winter pasture; plow under the rye during the springtime and plant cowpeas, using the peas as a hog pasture during the autumn; then return to corn or cotton the following year.

Another plan would be to devote the land one year to sweet potatoes instead of cowpeas, or to a crop of early Irish potatoes followed by cowpeas or crimson clover. In this rotation stable manure should be applied to the crop of corn or cotton, and the commercial fertilizers with the peanut and potato crops. Peanuts should invariably follow some well-cultivated crop which has been kept free from weeds.

The use of stable manure.—Stable or barnyard manure should not be used as a fertilizer the same year that the land is planted to peanuts owing to the great number of weed seeds that are contained in the manure. The use of manure also has a tendency to cause the plants to produce abnormal tops and a large percentage of poorly filled pods, known to the trade as “saps” or “pops.” The proper time for applying stable manure is with the crop grown the previous season, thus giving it time to become incorporated with the soil and reduced to the proper condition for the peanut crop.

Commercial fertilizers.—The peanut responds to the use of commercial fertilizers. However, a reasonable amount of humus in the soil is essential. If properly handled, the peanut crop is not exhaustive of soil fertility; in fact, the plant is a great nitrogen gatherer, as may be observed by the large number of nodules upon the roots. On the other hand, if the entire plant, including the root, is removed and no part returned to the soil the peanut becomes almost as exhaustive of soil fertility as cotton or corn. By feeding the straw and other refuse from the crop to cattle, hogs, and work animals and applying the manure thus obtained to the land the fertility may be retained or even increased.

On soils that are adapted to the production of peanuts it will not be necessary to employ commercial fertilizers in large quantities. Soils abundantly supplied with nitrogenous matter will, especially during a rainy season, produce an overgrowth of vine and poorly filled pods.

A commercial fertilizer adapted to the production of either Irish or sweet potatoes is as a rule suited for the growing of peanuts. A mixture which contains from 2 to 4 per cent of available nitrogen, 5 to 7 per cent of available phosphoric acid, and 6 to 10 per cent of potash is desirable; this should be applied at the rate of from 200 to

1,000 pounds to the acre, according to the needs of the land. Most growers follow the practice of scattering the fertilizer in a narrow strip where the row is to be planted, but for the general good of the land it is a better plan to sow or drill the fertilizer broadcast. In all cases it is important that the fertilizer be thoroughly mixed with the soil.

Importance of lime in the soil.—In order to insure the proper filling and ripening of the pods, peanuts require an abundance of lime in the soil. Where the soil is of a calcareous nature, containing limestone, shells, or lime in its more active form, it may not be necessary to make a regular application, but on soils that are deficient in lime or inclined to be in the least sour, from 1,000 to 2,000 pounds of fresh-burned lime should be applied to an acre every four or five years. The lime should not be put on at the same time as the commercial fertilizers, but rather during the previous autumn, or at the time of plowing the land. Wood ashes are desirable as a fertilizer for peanuts, as they contain both potash and lime. Unleached wood ashes may be applied broadcast at the rate of 1,000 to 1,200 pounds, 25 to 30 bushels, to the acre.

The presence on the land of certain weeds, such as the common sorrel and the sedges (which have three-cornered stems), indicates sourness and insufficient drainage; to correct this an application of lime will be necessary in addition to ditching or tile draining. Lime should be used on land that is to be planted to peanuts, unless it is definitely known that there is an abundance of it already present.

The peanut as a nitrogen gatherer.—The peanut plant, in common with other leguminous plants, has the power of collecting the free nitrogen of the atmosphere and storing it in little nodules upon its roots. For this reason the peanut is one of the more desirable of our soil-renovating and soil-improving plants. It should be borne in mind, however, that in order to benefit the soil the nitrogen so gathered should not be removed, but that the main portion of the roots should be left in the soil. Figure 4 shows the root of a peanut plant which is abundantly covered with the nitrogen-storing nodules.

THE SEED AND ITS SELECTION.

Importance of planting good seed.—A good grade of seed is just as important with the peanut as with corn, wheat, or any other crop. There is perhaps no other farm crop except corn that is so greatly influenced by the character of seed planted as the peanut. The very best peanuts of the previous season's crop should be selected for seed, and of these only the most mature and perfect peas should be used. Seed should be saved only from well-ripened and mature plants and should be properly eured and kept dry during the winter months.

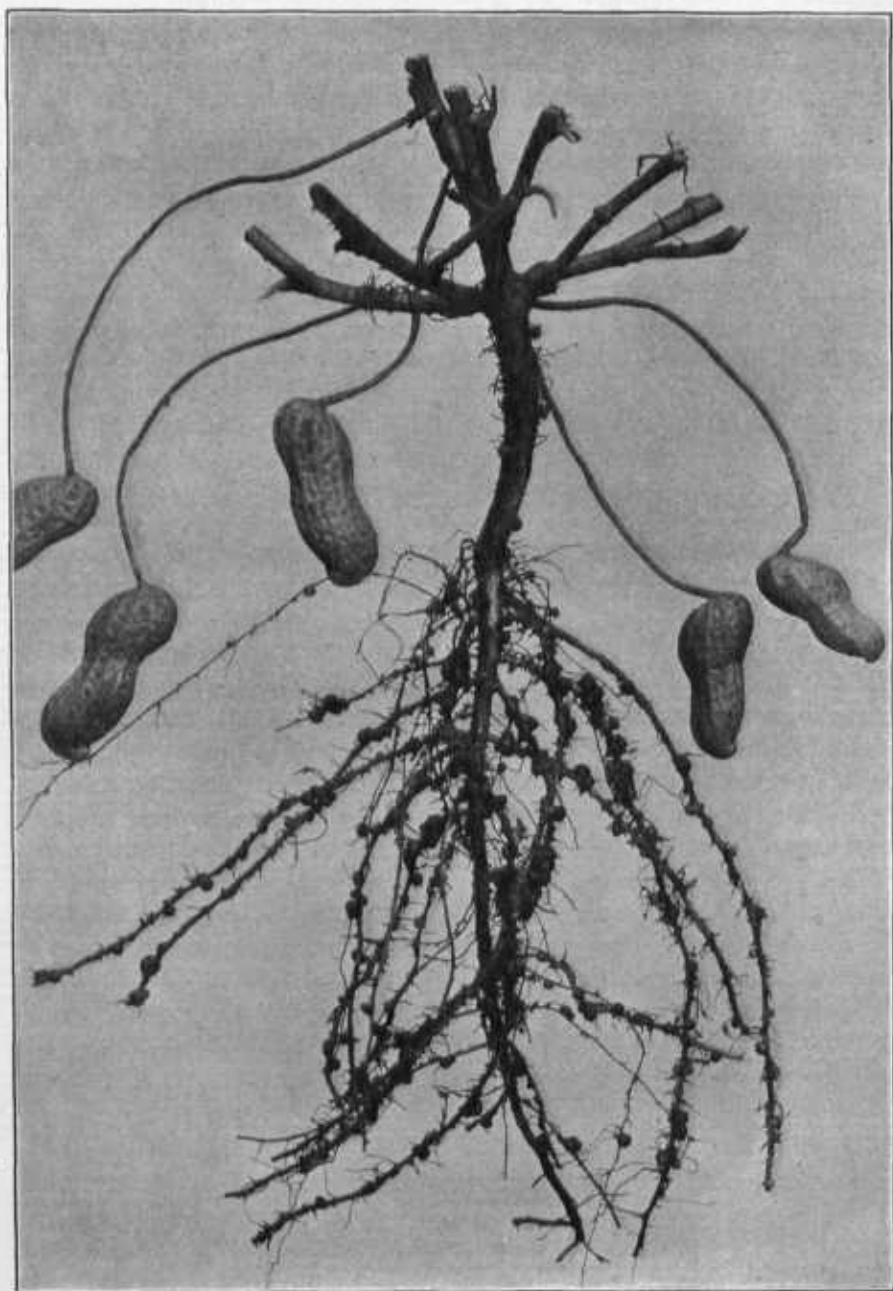


FIG. 4.—Roots of peanut vine, showing the value of this plant as a nitrogen gatherer. The nodules on the roots are formed by the bacteria which collect the nitrogen.

Good seed produces a more even stand of plants, which in itself returns a greater yield.

Improvement by selection.—The seed should not only be selected from plants that are mature, but from those producing a large number of mature pods as well. By doubling the number of well-filled pods on each plant the yield for each acre will also be doubled. Many millions of bushels have been added to the corn crop of the country simply through the selection and improvement of seed.

What has been done with corn is possible with the peanut, and where we now have an average yield of 34 bushels to the acre it is reasonable to expect this to be increased to 50 or 60 bushels through seed and cultural improvements.

Planting shelled or whole seed.—In planting the large-pod varieties it is desirable for several reasons that the seed be shelled. In the first place the planting machines now in general use are adapted to handling the shelled seed only. Second, when planting whole pods there is always a doubt regarding their being well filled, and a poor stand may result. Third, pods containing two or more seeds will produce more than one plant in a hill, causing a waste of seed and a crowding together of the plants. Fourth, whole seed is slower in germinating than shelled seed. With the Spanish variety the case is quite different, as several of the machines will handle the whole nuts, the pods are invariably filled, the crowding together of the plants is no great disadvantage, and the few days extra time required for germination is of little consequence.

Virginia nuts intended for seed should always be shelled by hand, but the Spanish are sometimes shelled by machinery, although their germination is invariably injured when so handled. Many growers of the Spanish peanut practice soaking the unshelled nuts in water previous to planting. Soaking for a few hours will hasten germination, but if for any reason the seed can not be planted immediately it will be lost. Shelled seed should never be soaked before planting.

TIME AND METHODS OF PLANTING.

The time for planting peanuts is in the spring after the soil has become thoroughly warm. In order to secure a good stand, the seed should not be put in the ground until there is sufficient warmth to germinate it quickly. As a rule peanuts should be planted a trifle later than corn and beans. The Spanish variety may be planted somewhat later than the Virginia type, as it requires less time to complete its growth.

Distance to plant.—A common distance between rows is 36 inches, but this varies somewhat according to the soil and variety. For the Virginia Runner variety on good soil the distance between rows

should be at least 36 inches, and 12 inches between the plants in the rows. Virginia Bunch peanuts may be in rows as close together as 30 inches, and 7 to 9 inches apart in the rows. The Spanish and Tennessee Red varieties are planted in rows from 28 to 36 inches apart and 7 to 9 inches apart in the rows according to the fertility of the soil. On rich soils, where the spread of vine will be great, the maximum distance between rows as well as between plants in the row should be allowed.

Quantity of seed required.—The quantity of seed peanuts required to plant an acre will depend somewhat upon the distances of planting.

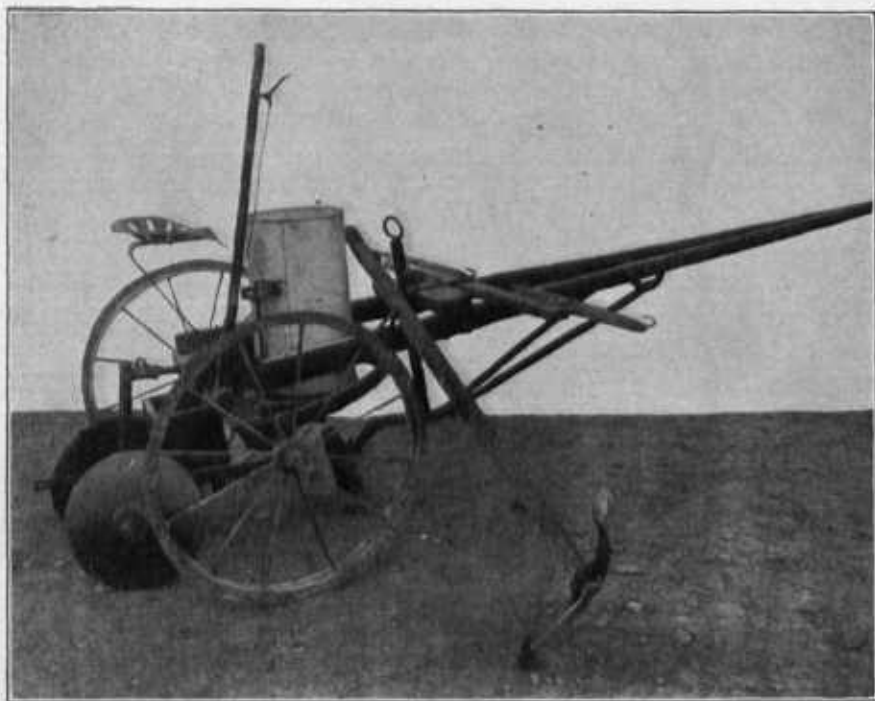


FIG. 5.—Machine for marking land and sowing fertilizer.

As a rule one-half bushel of shelled Virginia peas will plant an acre. One and one-half pecks of shelled Spanish peanuts, or 2 bushels in the pods, are required for an acre. The greater the care exercised in planting, the smaller will be the waste of seed, and economy is quite an object when planting specially selected or high-priced seed.

Depth to cover the seed.—The depth to which the seed should be covered will depend somewhat upon the character of the soil. On heavy soils three-fourths inch to $1\frac{1}{4}$ inches will be sufficient, while on light sandy soils $1\frac{1}{2}$ to 2 inches may not be too deep.

Tools and methods of planting.—Peanuts are generally planted in rows that are cultivated in one direction only. Some growers follow the practice of first marking the land with an implement similar to the ordinary corn marker. Others open a furrow with a one-horse plow, then after the fertilizer has been distributed in the furrow the plow is again used and a slight ridge thrown up. There is now on the market a tool of the type shown in figure 5, which sows the fertilizer, throws up a slight ridge, and at the same time indicates the position of the next row. If desired, this machine can be supplied with a seeding device, which will complete the planting at one operation.

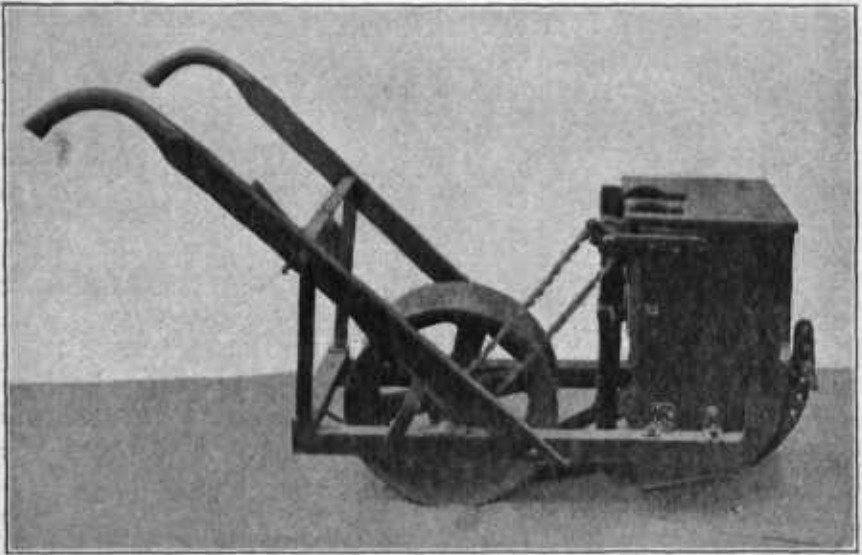


FIG. 6.—One-horse peanut planter.

The greater portion of the peanut crop is planted with the one-horse planters of the type shown in figure 6. These machines are similar in many respects to a cotton planter; in fact, a cotton planter may be adapted to planting either the whole Spanish or the shelled Virginia peanuts with very little trouble or expense. The ordinary peanut planter costs in the neighborhood of \$15 in most localities.

GENERAL CULTIVATION.

Method of cultivation.—Cultivation of the peanut crop should begin as soon as the rows can be followed and continue until the vines begin to occupy the ground. The work of cultivation should be pursued very much the same as for corn, beans, and all similar crops. Frequent shallow cultivation that will keep the soil loose and prevent the

loss of moisture is essential. Shortly after rains the surface soil should be stirred and during dry weather a dust mulch maintained. After the first cultivation it will be desirable to work the soil toward the rows to provide a bed of loose earth in which the pods may form.

After the peanuts begin to "peg," or form pods, they should not be disturbed or given further cultivation. The old idea that the blossoms of the peanut must be covered is erroneous, although growers frequently allow considerable soil to be thrown over the vines during the final cultivation. For the last cultivation it is a common practice to employ a tool that will both throw the soil toward the rows and leave a furrow in the middle of the alley to carry off water during heavy rains.

Common crab-grass is one of the most troublesome weeds of the peanut fields and it is often necessary to resort to hand hoeing in order to keep this and other weeds out of the rows. If the crop is

kept well worked with horse tools, very little hand labor will be required.

Tools adapted to cultivating peanuts.—Most implements that are adapted to the cultivation of corn or cotton will be found suitable for handling the peanut

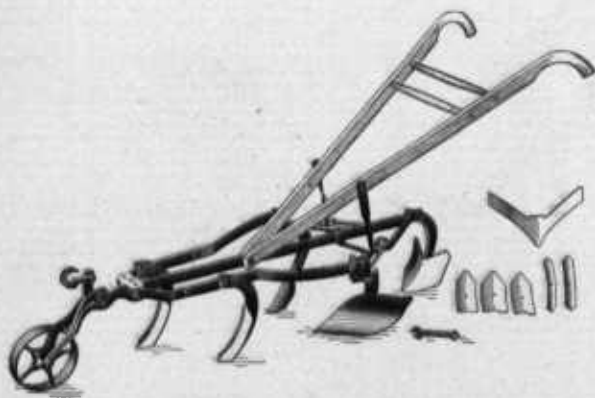


FIG. 7.—One-horse cultivator.

crop. For the first two or three cultivations a spring-tooth riding cultivator is desirable, while for the later workings the same implement can be used by changing the spring teeth for regular cultivator shovels. For one-horse cultivation the ordinary cotton sweep is frequently used, but the form of cultivator shown in figure 7 will do more efficient work. This implement is provided with several styles of narrow and broad shovels, sweeps, and hillers, making it adaptable to a great many changes and suited to a wide range of conditions.

Some growers follow the practice of running a light roller over the plants after the final cultivation, the object being to flatten the stems upon the ground in order that the little pods forming on the extremities of the stems may reach the soil. This practice may increase the yield, but it will also increase the percentage of "saps," or unfilled pods, and it is doubtful if anything is gained by the practice.

HARVESTING.

Proper time for digging the crop.—No fixed rule can be given by which to determine when to remove the peanut crop from the ground, and each grower must be his own judge in the matter. In general practice the growers aim to dig before the first frosts, in order that the peanut vines may have greater value for stock food. To the southward, where frosts do not appear until quite late, the vines assume a yellowish appearance during the latter part of the season, which indicates the ripening of the peas. If digging is deferred too long, the first-formed peas are likely to burst their shells and start growing; this is especially true if there is a period of rainy weather late in the season. The aim should be to dig at the time the vines have upon them the greatest number of mature peas. Where a large acreage is grown it will be necessary to begin harvesting as soon as the earliest peas are ready, in order to complete the work before unfavorable weather sets in.

Methods employed for lifting the plants.—Under ordinary circumstances the peanut vines are plowed from the ground with a one-horse

turning plow and afterwards separated from the soil by hand. Many growers employ either a two-horse plow similar to that frequently used for digging potatoes or a turn-

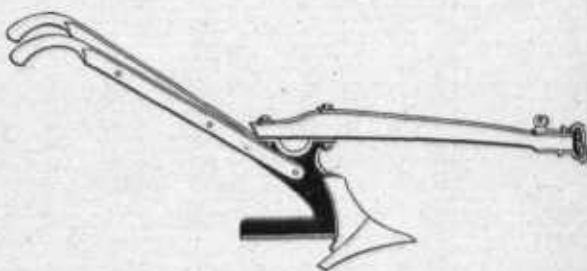


FIG. 8.—Plow type of peanut digger.

ing plow with the mold-board removed to prevent a furrow being turned. A digger of this type is shown in figure 8. Behind the digger or plow a gang of workmen shake the vines and peas free from the soil and throw them in small bunches. In this manner a team and driver accompanied by eight or ten hands will dig from 5 to 7 acres a day at a cost of about \$2.50 an acre.

It has been found by experiment that the regular machine potato digger drawn by two or three horses driven by one man will dig from 8 to 12 acres a day and do the work in a much cleaner and better manner than the old plow and hand method. This machine not only removes the peanuts from the ground in a more perfect manner but also shakes off the soil and leaves the vines lying loosely upon the surface of the ground. By the hand method a great many pods become detached from the vines, while with the machine potato digger scarcely a pod is lost. A machine of this character in operation is

shown in figure. 9. Another machine slightly different in design is shown in figure 10.

The cost of a machine potato digger is about \$100, but with proper care it should last many years; besides, one machine would do the work for two or more growers. Almost any of the machine potato diggers may be used for digging peanuts, but where the vines of the "runner" peas are exceptionally heavy there may be some difficulty in getting the vines through the machine. This difficulty may be overcome by providing disks or cutters to cut away the ends of the vines in front of the machine.

Special machines are now being offered which are intended to dig, clean, and bunch the peanuts. By setting any of these machines



FIG. 9.—Machine potato digger in use in digging peanuts.

to the proper depth it is possible to sever the main root of the peanut just below where the pods are formed and thus leave considerable of the accumulated nitrogen in the soil. It is estimated that the nitrogen left in the soil by this system has a fertilizing value of from \$3 to \$4 an acre.

Curing process and care of crop after digging.—After the peanut vines are loosened from the soil they are allowed to lie either spread upon the ground or in small bunches for three or four hours, and are then placed in small stacks around a central stake to cure. If the peas are allowed to lie exposed to the weather for any length of time after digging, the pods become discolored and lose in weight.

A better grade of peanut hay will be secured if the vines are placed in the small stacks as soon as the leaves and stems are thoroughly free from dew or other surface moisture. Most growers follow the practice of putting the peas in shock the same day they are removed from the soil, or those dug during the morning are stacked in the afternoon and those dug later in the day are stacked the following morning as soon as they are free from dew; however, any dew or rain will discolor the pods.

The essentials in caring for the crop during the curing period are that the peanuts be kept in small stacks, given an abundance of air, and protected from both the weather and injury from animals. Owing to the fleshy nature of the stems they cure quite slowly and are liable to mildew if placed in large lots.

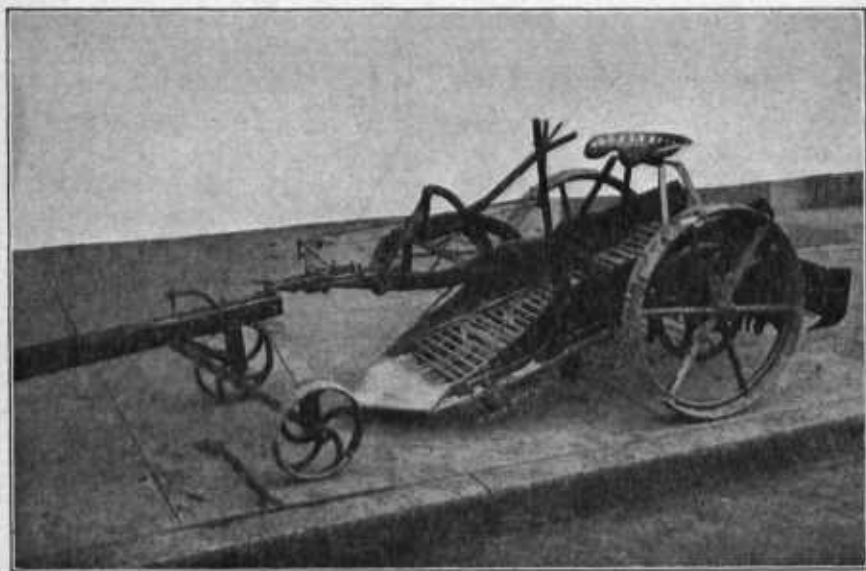


FIG. 10.—Machine potato digger adapted for harvesting peanuts.

In order to produce a good grade of peanuts for the market it is necessary to cure them in small stacks built around a central stake or pole. The supply of stakes should be ready in advance and may be kept for use from year to year. These stakes should consist of split or round poles about 3 or 4 inches in diameter, 7 feet in length, and sharpened at both ends. For setting the stakes in the ground a pointed bar of iron or a crowbar with which to make the holes is necessary. The stakes should be set in the ground to a depth of 12 to 18 inches and well tamped to make them firm and solid.

Before starting the shock one or two pieces of lath are nailed across the stake a few inches from the ground, in order to prevent the pea-

nuts coming in direct contact with the soil. In starting to build the shock a few vines are laid across the pieces of lath and the shock then built up by successive layers of vines, the pods being kept well to the center and the tops to the outside. The stems should have sufficient outward slope to shed water. Occasionally a few vines should be hung around the stake in order to tie the shock together. By this method the pods will be near the center and around the pole, where there is an upward circulation of air and general protection. When the shock has reached the desired height, a bunch of vines is rolled together and pressed down over the point of the stake to form a top, or a little grass or weeds may be used for this purpose.



FIG. 11.—Stakes around which shocks of peanut vines are to be built.

The majority of growers follow the practice of placing the shocks singly in rows in the field where the crop is grown; others arrange them in groups of from four to ten, while some growers haul the crop to a stacking yard, where the shocks are built closely together. Figure 11 shows stakes set in the ground and crosspieces nailed on. Figure 12 shows a shock during construction, as well as completed shocks in the background. Figure 13 shows the method of stacking closely together.

Storage in barns is not advisable when curing peanuts for market, but where the entire plant is fed to stock the crop may be handled in much the same manner as cowpeas, velvet beans, or a heavy growth of clover.

PICKING AND CLEANING.

Peanuts for market should be cured in the shock at least three or four weeks before picking. If the weather is dry and windy immediately after harvesting, the curing process will be quite rapid, but should the weather conditions be unfavorable during this period the pods will ripen more slowly. Too rapid curing is not desirable, as the pods are likely to shrivel and discolor. Peanuts should not be picked from the vines until the pods have become dry and the peas firm and nutty, with the immature ones more or less shrunken. As a rule very little is to be gained by early marketing, and a better



FIG. 12.—Laborer building a shock of peanut vines, showing method used. Completed shocks in background.

grade of peanuts will be secured if picking is deferred until late autumn. If the pods are not well protected in stacking, many will be destroyed by the common blackbird. In some sections it is necessary to pick as early as possible to prevent heavy loss from the ravages of field mice and rats while the peanuts are in the shock.

If peanuts are not well stacked the pods are liable to become discolored by the heavy fogs and driving rains of late autumn. The stacks should not be opened or the vines handled during wet weather.

Picking by hand.—The standard of excellence in the peanut markets is always based upon hand-picked stock. Peanuts that are picked

by hand now bring a higher price than those picked by machinery, but with the present scarcity of labor and rapid improvement in peanut-picking machinery the time will soon come when a uniform price will be paid for a given quality of peas regardless of how the picking is done.

Figure 14 shows a characteristic group of pickers at work in a peanut field of southern Virginia. Hand picking is at best a dusty and laborious task and is usually done by the women and children. Where the vines are well set with pods a good picker will handle from 8 to 12 bushels a day. The price paid per bushel for picking varies from 8 to 20 cents, according to the quality and variety of peanut, but 10 cents is the ruling price paid for picking Virginias.

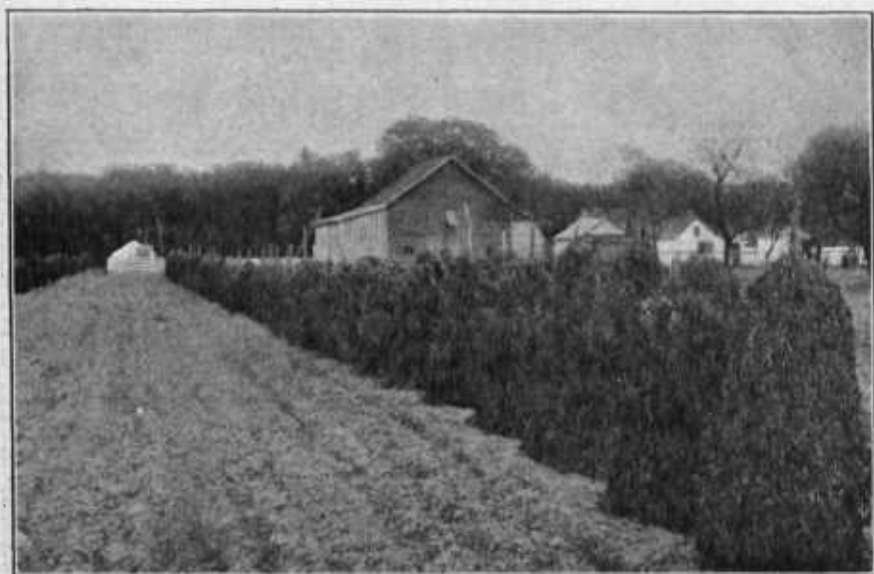


FIG. 13.—Peanut shocks placed close together near farmyard.

In some localities the pickers are paid by the hundred pounds, 40 cents a hundred being the average price paid. At this rate the cost of picking the peanuts grown on one acre will vary from \$4 to \$8.

Use of machines for picking.—Two types of machines have been employed for picking peanuts from the vines, and most of the work done by them has been quite satisfactory. A cylinder machine similar to a regular grain separator except as to size has been used for several years, especially in the districts where the Spanish variety is extensively grown. The principal objection to all the cylinder machines is the tendency to break the pods and both shell and injure the peas. By running the cylinder quite slowly, say at 400 revolutions a minute, and feeding properly it is possible to thrash peanuts by

using a cylinder machine with a very small percentage of loss from breakage. Pods that are merely cracked or that have what the growers term "oyster mouths" will not keep for a long period but become rancid or are injured by small insects while in storage.

There is a machine in use which works upon an entirely different principle from the cylinder machines and which does not break or injure the pods. In this machine the picking is done by dragging the vines over a horizontal wire mesh, and at the same time brushes act on the lower side of the wire screen to remove the nuts. Very little power is required to operate this machine, two complete outfits being run at once by a 5-horsepower gasoline engine. The capacity



FIG. 14.—Picking peanuts from the vines by hand.

of this machine is from 300 to 500 bushels a day. In addition to removing the pods from the vines the machine has the usual cleaning arrangements and a device for removing the small stems from the pods, delivering them in a condition suitable for the cleaning factory. Figure 15 shows one of these machines in operation.

Care of peanuts after picking.—At no time after the curing process should the peanut pods be exposed to water, or even dampness, as the shells invariably become darkened and discolored by the addition of moisture. When properly cured the shells will be covered with a fine, dry dust, and where this dust becomes moistened it adheres and

forms a brownish spot. If the peanuts show the least trace of dampness after their removal from the vines, they should be spread on a floor or stored in a well-ventilated building until thoroughly dry. Many of the larger growers have provided narrow cribs similar to those employed for the storage of corn, and the peanuts are kept in bulk until sold. When the pods are thoroughly dry they may be put into bags as they come from the machine, and either hauled direct to the cleaning factory or stored in small lots.

Preparation of peanuts for market.—As the peanuts come from the hands of the pickers or the thrasher they contain considerable rubbish and have more or less soil adhering to the pods. The extent to which the pods must be cleaned and graded will depend upon the use to which they are to be put; if for vending purposes they will require a factory process, but if for shelled nuts very little work will



FIG. 15.—An improved type of peanut-picking machine in operation.

be necessary to prepare them for the sheller. Under the present status and extent of the peanut industry the cleaning factory has become an important factor, and the interests of the grower and cleaner are correlative and should be cooperative. Where Spanish peanuts are grown on an extensive scale it may be feasible for the farmer to own and operate a small shelling and cleaning outfit. In the case of the large-podded varieties several grades are made from one class of stock, requiring an extensive, although simple, equipment and the handling of large quantities of nuts in order to make the enterprise profitable.

Methods of cleaning peanuts in the factory.—The cleaning or factory process consists chiefly in the removal of all dirt and the separating of the nuts into their respective grades. In addition to grading,

the higher class product is treated to a polishing process, which gives the pods a more attractive appearance when exposed for sale. The modern peanut-cleaning factory consists of a four or five story building, which is supplied with power, lighted by electricity, and provided with elevators and bins for handling and storing the unclean nuts. It also has a full equipment of fans, grading machines, polishing drums, and shellers, and an abundance of lower-floor space for the storage of the bags of nuts that are ready for marketing.

When the peanuts are received from the farmer at the factory they are weighed and then elevated to the top floor of the factory. During the cleaning and grading process they descend by gravitation through the fans and graders, are tumbled in the polishing drums together with a small quantity of marble dust to whiten and polish the pods, are passed on slowly moving belts between lines of women who are expert in detecting foreign matter and inferior nuts, and finally drop into bags on the lower floor.

In the modern cleaning factory all dust and refuse is removed by means of fans and ventilators, the portions of sticks, stems, and broken shells being conveyed to the boiler room and fed into the furnace. One advantage of a factory process is that nothing need be wasted, as all broken or split peas can be worked into the stock used in the manufacture of peanut products.

Cleaned vines as stock feed.—The peanut vine or straw from which the nuts have been removed is of considerable value for feeding purposes. Where the peanuts are picked from the vines by hand the stems become broken and the greater portion of the leaves is lost, but where machines are used for picking it is possible to save the straw in fairly good shape. If the vines are carefully handled during the curing process and then put in barns or stacks that keep out rain, the straw when delivered from the thrasher will have a feeding value about equal to clover hay. If the vines are bright and clean after the pods have been removed they can either be sold or fed to farm animals, and they will in this way partially pay for the cost of planting and cultivating the crop. Some growers employ a baling press and bale the straw as it comes from the thrasher in order that it may be more easily stored and also be available for marketing.

VARIETIES OF PEANUTS.

There are not more than five or six distinct varieties of the peanut grown in the United States, but these few varieties represent at least three separate types. By classifying the varieties of peanuts according to types we have first the large-podded, or Jumbo, peas and the small-podded peas. These types are subdivided into bunch and run-

ning peas. Figure 16 shows pods and peas of the more important commercial varieties.

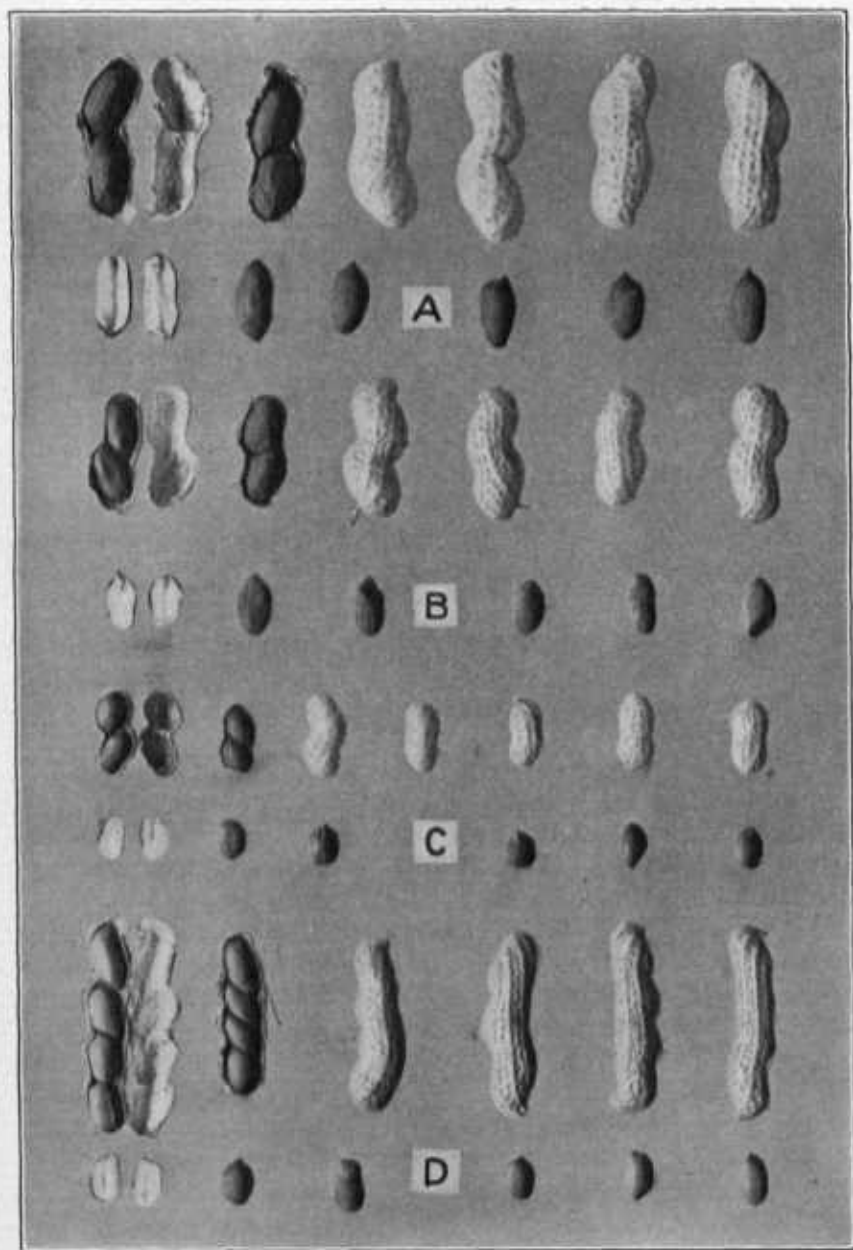


FIG. 16.—Commercial types of peanuts. (A) Virginia Bunch or Virginia Runner; (B) North Carolina; (C) Spanish; (D) Tennessee Red. (About one-half natural size.)

Those varieties having a bunch habit of growth are most generally grown, owing to the fact that they may be planted closer together

than the running varieties. The bunch varieties are also more easily cultivated and harvested than are the runners.

DESCRIPTIONS OF VARIETIES.

The following descriptions of the more common varieties of the peanut may be of interest to those not already familiar with them:

Virginia Bunch.—Large-podded variety, plant rather dwarf, stems upright, foliage rather light; pods clustered about the base of plant; usually two, sometimes three, seeds in a pod, pod bright and clean, color of peas light brown; pods adhere well to plant in digging. The customary weight per bushel of this variety is 22 pounds. (Fig. 17, and fig. 16, A.)



FIG. 17.—Virginia Bunch type of peanut.

Virginia Runner.—Large-podded variety, strong grower, stems creeping, foliage heavy; pods scattered along procumbent stems, pods and peas very similar to those of the Virginia Bunch; pods do not adhere well in digging. The customary weight per bushel of this variety is 22 pounds.

North Carolina.—Similar to Virginia Runner, except that plant is not so large or vigorous and pods and peas are both smaller. This variety contains a high percentage of oil. (Fig. 16, B.)

Spanish.—Small-podded variety, strong grower, stems upright, foliage abundant and heavy; pods clustered about base of plant;

usually two seeds in a pod, entirely filling the pod; pods rough and inclined to be darkened in color; color of peas light brown; pods adhere well to plant in digging. This variety frequently yields 60 bushels of marketable peas and 2 tons of hay to the acre. The peas of this variety are rich in oil content. The weight per bushel of Spanish peanuts is 28 pounds. (Fig. 18 and fig. 16, *C*.)

Tennessee Red.—Small-podded variety; similar to Spanish, except that the pods are longer, sometimes containing five or six peas crowded together; peas dull red in color. This variety is well adapted to stock feeding, but does not sell upon the market owing to the color and quality of the peas. (Fig. 16, *C*.)



FIG. 18.—Spanish type of peanut.

Dixie Giant.—The variety known as Dixie Giant is so called owing to the great size of its pods. It is distinctly a novelty, does not yield well, and requires a long season for the pods to mature. Recommended only for southern part of Gulf Coast States. The peas of this variety are very large and are desirable for the manufacture of fancy blanched nuts.

VARIETIES FOR MARKETING.

For vending purposes, where the peas are roasted and sold from the fruit stands, the large-podded varieties, including Virginia Bunch

and Virginia Runner, are in greatest demand, although considerable quantities of Spanish and North Carolina are used for this purpose. For shelled peas the smaller nuts of the large-podded stock are employed; also the greater part of the crop of Spanish, North Carolina, and Tennessee Red varieties. A large percentage of stock that is shelled is of the variety known as Spanish.

VARIETIES FOR STOCK FEEDING.

When peanuts are grown exclusively for feeding purposes the Spanish is undoubtedly to be preferred. If it is desired to market the high-grade portion of the crop and feed the remainder, the question of variety to be grown will depend largely upon locality. Many growers throughout the peanut area follow the practice of planting several acres of Spanish peanuts and disposing of all of the better-grade peas to some factory for shelling purposes, the vines and poorly filled pods being fed to the farm animals. The Spanish peanut can be grown under a much broader range of conditions than can the large-podded sorts and should be employed where the season is short.

This variety also produces a heavy yield of vine and is desirable for forage purposes. The Tennessee Red is very similar to the Spanish in habit of growth and is desirable for stock feeding, but as this variety does not sell readily upon the market it is not generally recommended.

THE USES OF THE PEANUT.

To most persons the peanut suggests only the article as it appears for sale whole or shelled and salted, but during recent years the uses of peanuts have become numerous, and include a wide range of utility. The demand for peanuts for use in the manufacture of food preparations is constantly increasing. By-products of the peanut are now being employed extensively in the manufacture of feeds for farm stock and dairy cows, and the plant is being largely utilized as forage and as a soil renovator.

Important uses for human food.—Among the more important uses of the peanut for human food are the following: It is eaten from the shell, as salted shelled peas, as blanched peas, in the so-called peanut candies and brittle, in combination with pop corn and puffed rice, in the form of peanut butter, and as an ingredient of peanut and vegetable meats, peanut meal, and salad oils.

The use of the peanut for eating from the shell when roasted is most important and popular, but the quantity of shelled peas that are first roasted and then salted and sold by the pound is constantly increasing.

A comparatively small quantity of the better grades of peanuts is first shelled and then roasted and the thin brown covering removed, after which the halves of the peas are broken apart, the small germ removed, and the meats given a blanching process which renders them very desirable for table use.

Greater quantities of shelled peas are used every year in the manufacture of peanut candies and brittle, both alone and in combination with other nuts, pop corn, or puffed rice. A very desirable kind of peanut candy can be made by simply boiling shelled peanuts with a thick sirup consisting of 2 pounds of granulated sugar and one large cupful of water, together with a teaspoonful of lemon juice. When the sirup begins to boil add 2 pounds of unroasted shelled peas and cook slowly until the peas are tender and the sirup sufficiently hard to break when quite cold. The cooking process should as a rule continue for about an hour, when the mixture should be poured on a cold buttered platter to cool. Peanut candies are as a rule not adapted to handling in warm weather and should be kept cold after making.

During recent years great quantities of shelled peanuts, especially of the Spanish variety, have been employed for the manufacture of peanut butter. This butter is prepared by the ton in factories, is put up in bottles or tins containing from one-fourth pound to 5 pounds each, and has become very popular as a part of the luncheon menu and for camping and cruising supplies. In the process of the manufacture of peanut butter the shelled peas are first given a medium roast, care being taken that the meats do not become overdone or scorched. The peas are then fanned and screened to remove the thin brown coverings and the germs, after which they are ground to a pulp by means of a special grinder similar to those used for chopping meats. As the peanut pulp comes from the grinder it is fed through a tin tube into the bottles or tins and tightly sealed. Some manufacturers follow the practice of salting the peanut butter, while others leave this part of the process for the consumer, who can easily salt to suit the taste.

By a little experience and the aid of a small meat grinder, any one can make good peanut butter for home use. The peanuts may be roasted before or after shelling, but in either case the oven should be only moderately hot and the peas should be stirred frequently. After roasting, rub off the skins and screen out the small germs, or hearts. In grinding, use the finest plate on the grinder and screw up the tension until the crank will be quite hard to turn. If the pulp is too coarse after one grinding it may be run through a second time. It will not be necessary to add anything but a little salt to the butter, but if desirable the butter may be thinned by the addition of a little olive oil.

In the preparation of vegetarian meats a portion of the oil is expressed from the ground peanuts, other ingredients, including various vegetable substances, are added, and the whole is crushed and pressed into tins ready for use. In this case the extra oil is either used for thinning peanut butter or sold as a compound for use in further cooking the vegetable meats.

Peanut meal, made from finely ground blanched peanut meats, is used to some extent in confections. This meal is especially desirable in the manufacture of almond macaroons and small cakes, to which it imparts the desired almond flavor. This meal is also used in the manufacture of candies.

Peanut oil is used in the same manner as olive oil; also for mixing with cotton-seed oil in order to improve the quality of the cotton-seed oil for salad purposes.

The uses of peanut by-products as foods for live stock.—In the factories where peanuts are cleaned, shelled, and graded ready for the market there is always a certain percentage of cleanings and inferior stock that can readily be turned into stock foods. The outside shell, or hull, of the peanut is rich in food materials but is extremely difficult to reduce to a condition in which it can be fed. In large cleaning factories the shells are generally used as fuel, and the ash resulting therefrom is valuable as a fertilizer, often containing as high as 3 per cent of phosphoric acid, 9 per cent of potash, and 6 per cent of lime.

The thin brown covering of the peas has a feeding value almost equal to that of wheat bran. These hulls are especially desirable for mixing with the smaller particles of broken peas for stock feeding. In large factories where peanuts are prepared for the manufacture of peanut butter and similar preparations the waste in the form of small particles of the meats and the germs is considerable and is sold to farmers for feeding purposes. In some cases the waste is mixed with a portion of the hulls and finely ground or chopped before leaving the factory. Peanut hulls can not readily be ground by means of a burr mill but require some form of chopping or shredding process.

Broken peas and germs are used largely as a food for hogs, and both should be fed in moderation and in combination with some grain, as the peanut fed by itself will produce a hog having soft fat and inferior meat. The famous Smithfield hams and bacon come from hogs that are partially fed on peanuts, the practice being to turn the hogs into the peanut fields after the crop has been gathered and allow them to glean the pods that were lost in harvesting. The principal objection to the use of peanut by-products as stock feeds is their tendency to become rancid very quickly. The germs, which

are high in nitrogen content, become rancid and bitter in a short while and should not be kept on hand for a greater period than fifty or sixty days.

Possibilities in the manufacture of peanut oil.—The oil of the peanut belongs commercially in the same class as do cotton-seed and olive oils. Peanut oil is of a higher grade than cotton-seed oil and of somewhat lower value than first-class olive oil. Peanut oil is sometimes used for mixing with olive oil for the production of an oil that can be sold at a lower price than pure olive oil. On the other hand peanut oil is frequently mixed with cotton-seed oil in order to improve the quality of the cotton-seed oil for certain purposes.

The quantity of oil that may be obtained from the peanut will depend upon the variety, the maturity of the peas, and the apparatus with which the extraction is made. The Spanish meats when shelled and thoroughly cleaned frequently contain as high as 45 per cent of oil, as shown by chemical analysis, although not more than 34 per cent can be expressed by the best of present methods and perhaps about 28 per cent by ordinary machinery. It is generally conceded that in order to make the manufacture of oil profitable good peanuts must be obtainable at prices not exceeding 40 cents a bushel. A bushel of first-class Spanish peanuts, weighing 28 pounds, will produce about 1 gallon of oil, worth 45 cents, and 20 pounds of oil cake and hulls, which when ground and mixed together will be worth approximately 25 cents, or \$25 a ton, as stock feed.

The greater portion of the peanut oil of commerce is manufactured at Marseille, France, from peanuts that are bought very cheaply along the coast regions of Africa and transported by ships as return cargo. The African-grown peanuts are very rich in oil, often containing as high as 50 per cent. With a coming shortage of cotton seed from which to manufacture oil in this country there is a great possibility of building up a peanut-oil industry throughout the cotton belt of the Southern States. As already mentioned, there are thousands of acres of land now lying idle that will produce fairly good crops of peanuts, and their growth will improve the land. By combining the use of cotton seed and peanuts for the production of oil it would be possible to keep the existing oil mills of the South running and at a profit to both the farmer and mill owners. The oil that remains in the cake will not be lost, as there is demand for the cake for the manufacture of vegetarian meats and for stock feed.

The process of expression is very similar to that for cotton-seed oil and the greater portion of the machinery of the present oil mills is adapted to the manufacture of peanut oil. It would be necessary, however, to add special appliances for shelling, cleaning, and macerating the meats of the peanut.

THE IMPORTANCE OF THE PEANUT AS A FARM CROP.

In sections where the soil and climate are suitable the peanut is rapidly becoming a crop of general farm importance. In the Southern States peanuts can be grown under a wide range of conditions, and the product can be used for several purposes. Peanuts are valuable as a substitute for cowpeas, especially on certain soils that are not adapted to the growing of the cowpea. In many sections where the clovers and other soil-renovating crops will not withstand the heat and drought of the summer months, the peanut will thrive and make an excellent growth. A crop of peanuts for forage can



FIG. 19.—Peanuts growing in the alleys between rows of corn.

often be grown after the removal of oats or some other spring crop, and although they may be badly overgrown by crab-grass, the tops may be mown with the grass for hay, and the hogs turned in to root out the peas.

Throughout Georgia and the surrounding Gulf Coast States the peanut is extensively used for planting in the alleys between the rows of corn. The peanuts are planted at the time the corn is given the last working, and are allowed to grow as a catch crop among the corn. (Fig. 19.) After the corn is pulled, cattle are turned in to eat the fodder and the peanut tops. Following the cattle the land is pastured by hogs to clean up everything that remains. In this

way most of the nitrogen stored by the peanut roots is left in the soil. Peanuts can be planted between rows of cotton in the same manner.

The value of peanut hay for feeding purposes.—The tops of the peanut plant when cut and cured in the same manner as other legumes will produce a hay that is almost equal in feeding value to the best clover hay. By planting the Spanish peanut in rows from 24 to 30 inches apart and quite closely in the row and by giving the crop about two cultivations, it is possible to produce from one to two tons of hay to the acre. After the hay is removed the pods can be turned out by means of a plow, cured, and stored for winter feeding, or hogs may be turned in to gather the crop. The following table shows the comparative value of peanut hay.

TABLE I.—Comparative analysis of peanut hay and other hays.

Dry matter.	Protein.	Carbohydrates.	Fats.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Peanut hay.....	11.75	46.95	1.84
Peanut, entire plant.....	13.48	36.28	15.06
Clover hay.....	12.84	48.81	2.11
Timothy hay.....	7.17	52.94	1.97
Cowpea hay.....	19.72	45.15	4.04
Alfalfa hay.....	16.48	42.62	2.03

Peanut straw, consisting of the entire vine after the salable nuts have been removed, has a somewhat higher feeding value than the tops alone, due to the fact that many of the inferior pods are left in the straw. Peanut straw is, however, not so bright or palatable for feeding as are the peanut tops when cut and cured especially for hay.

The value of the entire peanut plant as forage.—Throughout that portion of the Southern States where field corn does not yield a satisfactory crop, the place of corn for feeding to animals may be largely taken by the peanut. On some ranches where a large number of work animals are maintained the Spanish peanut, including the entire plant, is practically the only feed used.

The peanut vines and peas when chopped or ground together form almost a balanced ration for a dairy cow. The following table will give some idea of the comparative value of peanut products and other feeding stuffs.

TABLE II.—*Comparative analysis of peanuts and other feeding materials.*

Dry matter.	Protein.	Carbohy- drates.	Fats.
	<i>Per cent.</i>	<i>Per cent.</i>	<i>Per cent.</i>
Ground corn and oats	9.6	71.9	4.4
Corn meal.....	9.2	68.7	3.8
Wheat bran.....	15.4	60.4	4.0
Cotton-seed meal.....	42.3	23.6	13.1
Peanut kernels.....	26.6	16.7	42.0
Peanut vines.....	10.0	42.0	3.6
Clover hay	12.4	33.8	4.5
Alfalfa.....	14.3	42.7	2.2
Peanut, whole plant	18.4	40.1	21.5

The use of peanuts for fattening hogs.—As already suggested, the peanut is a valuable feed for use in preparing hogs for market, the usual custom being to turn the hogs into the peanut fields and allow them to glean whatever is left after harvesting. In some sections peanuts are being grown primarily for feeding to hogs. Poorly filled nuts, broken peas, the germs, and waste products generally are fed to hogs during the earlier part of the fattening period. A hog that is fattened exclusively on peanuts will not yield a desirable class of meat or lard, as the meat will lack firmness and the lard be soft and oily. Toward the end of the fattening period the hog should be fed almost exclusively on corn. Hogs will eat considerable of the peanut tops when pastured on them, and the plan of dividing the field into small areas by portable fences and allowing the hogs to gather the peas is perhaps the most economical.

Methods of handling and curing peanuts for forage.—Where the entire peanut plant is to be stored and used for feeding to stock the work of curing and caring for the vines should be very much the same as in curing cowpea hay, although the peanut vines will cure more rapidly than those of the cowpea. The vines are plowed from the soil or lifted by means of a potato digger, and after being allowed to lie exposed for a few hours are raked into very small windrows by means of an ordinary hay rake. After partially drying in the windrows the vines are put up in small shocks, preferably around poles. The main object in the handling of peanut vines for forage will be to get the stems and peas properly cured without losing the leaves, and in order to do this it is necessary to keep them in bunches and to dry them gradually. After the vines are sufficiently dry they may be stacked around a pole or hauled to the barn and stored in the hay mow. Where the stacking method is employed the stacks should be rather small, say not over a ton each.

Peanut vines for forage purposes can be handled in the same way as those of the cowpea and yield a very desirable class of forage. Persons who have used the peanut exclusively for feeding purposes

claim that they have had no difficulty in feeding it to all kinds of work animals, even driving horses. It is well, however, to feed only a part ration of peanut vines at first and observe the animals until they become accustomed to this form of diet. Under ordinary circumstances the plant is fed without removing the nuts, but it may be well in some cases to pick the peanuts from the vines and grind them, shell and all, and then feed as a meal with the vines.

INSECTS INJURIOUS TO THE PEANUT.

The insect enemies of the growing peanut crop have been so few that very little attention has been given them by the entomologists. Recently there has been reported a species of aphid working upon the roots of the peanut plants. This insect belongs to a class that obtains its food by sucking the juices of the plant from beneath the surface of the leaves, stems, or roots. The presence of this root aphid is indicated by patches of what appears to be a white mold upon the roots and pods of the peanut and is generally not observed until digging time. Thus far no great injury from these insects is apparent, but should they become very numerous great damage will ensue, and about the only satisfactory remedy which the writer can suggest is crop rotation, planting peanuts on clean land each year, and only returning to the original piece after a period of four or five years.

While in storage peanuts are attacked by various insects. So long as the shells remain unbroken these insects can not gain access to the meats, but where the shells have been injured or broken in thrashing or in subsequent handling the peas can not be kept during the summer months. These insects are especially destructive in storage houses and cleaning factories where peanuts are held for summer trade. They may be destroyed by fumigation with carbon bisulphid in the factory or warehouse. Carbon bisulphid forms an inflammable gas, and its use is attended with some danger and should be applied by an experienced person.^a

DISEASES OF THE PEANUT.

The peanut crop has thus far been remarkably free from disease. About the only disease that has been at all prominent is a form of

^a For information regarding the use of this insecticide the reader is referred to Farmers' Bulletin 145, which may be obtained upon application to the Secretary of Agriculture. No general work has been published by this Department on the insect enemies of peanuts, but information in regard to any of them may be obtained by application to the Bureau of Entomology. Correspondence will be facilitated if specimens of the insects concerned in the damage accompany letters of inquiry.

leaf-spot (*Cercospora personata* (B. & C.) E. & E.) which appears in the form of small brown spots on the leaves. (Fig. 20.)

This disease is especially noticeable on the young plants during a wet spring, giving the leaves the appearance of having been scalded by the sun. Later in the season the plants will as a rule outgrow the disease, except in low or poorly drained portions of the fields. Where the disease is abundant upon the foliage the pods are frequently discolored and rusty. There can be no doubt that this disease causes considerable reduction in yield on land that is sour or poorly drained. It is often observed that the disease will be abundant in low spots without spreading to other parts of the field. The presence of the

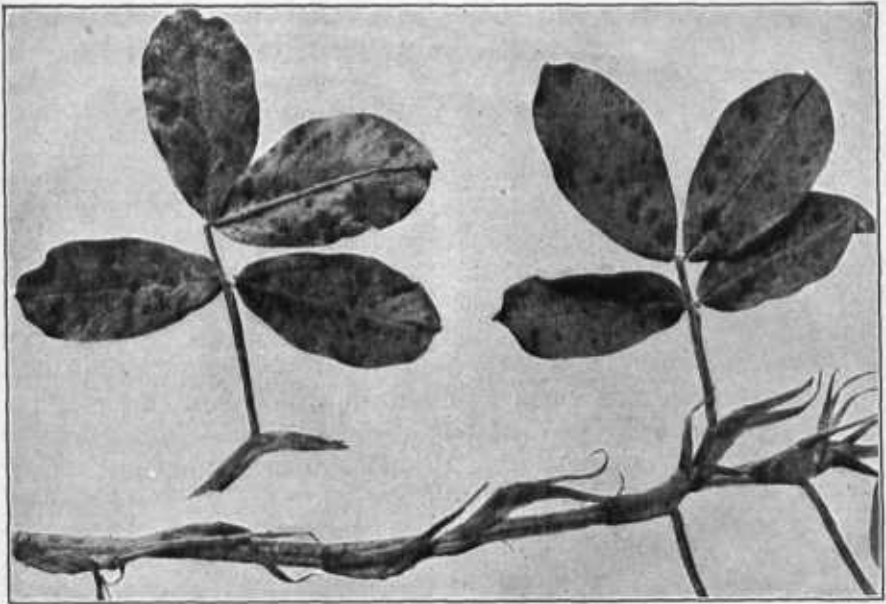


FIG. 20.—Disease appearing upon the leaves of the peanut.

disease upon the foliage of the peanut greatly decreases the value of the vines for hay. Should this trouble become prevalent it may be controlled by spraying with Bordeaux mixture. Its development may be prevented by proper drainage.

CONCLUSIONS.

The peanut is worthy of more general cultivation throughout the Southern States, especially in the boll-weevil district, where it will in many cases be found more profitable than cotton.

The uses of peanuts as a general farm crop throughout the Southern States are becoming more numerous, especially as a means of

providing suitable forage for range stock during the short winter period.

The demand for peanuts to be used in the preparation of human foods is constantly increasing.

The United States is a heavy buyer of peanut oil that is produced abroad, while there are thousands of acres of waste lands in the Southern States that would produce enough peanuts to keep the cotton-seed-oil mills running and furnish more than enough oil for home consumption.

The peanut is a soil builder and renovator. If included in the crop rotation and properly handled, peanuts are not exhaustive of soil fertility.

While the average yield of peanuts is only about 34 bushels an acre, with proper methods a yield of 60 bushels of peas and 1 to 1½ tons of forage may reasonably be expected. There are authentic records of yields of 160 bushels of Spanish peas, together with 2 tons of forage, per acre.

The peanut vines, after the removal of all the first-class peas, have a feeding value practically equal to the cost of the field culture of the crop. An acre of first-class peanuts, calculating the yield at a ton of vines, worth from \$8 to \$10, and 60 bushels of peas, worth \$40 to \$60, will give an income of from \$48 to \$70. The cost of growing an acre of peanuts is variously estimated at from \$12 to \$25, including seed and fertilizers. These figures show a net return of from \$36 to \$45, which is above the average for the crop as now grown in the United States, but decidedly lower than may be expected under favorable conditions and proper cultural methods.